



The explosion of fake olive oil can be attributed in part to the growing demand for premium oils. Image Source: Flickr user U.S. Department of Agriculture

When I buy olive oil, I am convinced that the more expensive brands are better. While I don't necessarily seek out the priciest bottle, I do like to stay at least at the lower end of the premium range, maybe a little higher. A nice label and fancy bottle shape usually seal the deal. I tell myself that I can definitely tell a difference and that the extra \$10, 15, 20 is totally worth it.

But it turns out that I've most likely been fooling myself thinking that I'm buying a superior product. In fact, I may not be buying olive oil at all, nevermind extra virgin olive oil. In fact, fake olive oil currently represents one of [the most prevalent forms of food fraud](#) throughout the world.



Extra virgin olive oil fetches significantly higher prices than lower oil grades, providing plenty of motivation for adulteration and counterfeiting.

Image Source: Flickr user saragoldsmith

Motivation and Manufacturing

In the United States, olive oil is a \$1.5 billion industry and growing as consumers like me [increasingly seek out premium products](#). These premium products nearly universally fall under [the category of extra virgin oil](#), or the best of the best as defined by the International Olive Council and the USDA. But according to an explosive book by journalist Tom Mueller, 70% of oils sold as extra virgin olive oil are in fact adulterated or counterfeit.¹ “[Extra Virgin olive oil] demands a premium price – as much as 10 times that of a lower grade,” notes a writer from Forston Labs. “This price differential is the primary motivation for adulteration and/or counterfeit labeling at any point in which a sale of the oil occurs.”²

Fake olive oil is typically manufactured by [adding cheaper edible oils](#) like sunflower, soybean, hazelnut, and olive pomace oils to real olive oil. In some cases, however, what is labeled as extra virgin olive oil contains no actual olive oil at all. And while those of us who fork out the extra cash for premium olive oils would like to imagine we could instantly identify these fakes based on taste, research found that that simply isn't true. “I conducted a blind tasting of extra virgin olive oils a few years ago for a national newspaper that wanted ‘the truth on expensive olive oil’,” says Alex Renton in an article for *The Guardian*. The blind testing included both high-quality, pure oils and those known for adulteration:

We had a dozen oils, and a panel consisting of an importer, an Italian deli owner and a couple of eminent foodies: the results were so embarrassing and confusing the piece was never published. The importer went into a fugue after he was informed that he'd pronounced his own premium product “disgusting”; the deli owner chose a bottle of highly dubious “Italian extra virgin” as his favourite (it had cost £1.99 at the discount store TK Maxx); and both the foodies gave a thumbs-up to Unilever's much-derided Bertolli brand.³

As Kristen Michaels of *Food Renegade* says, “Some of us are deluded into thinking we can taste a difference between real olive oil and fake olive oil. We can not.”



UV-Vis spectrophotometry offers a simple, fast, and economical way to detect fake olive oil, helping companies protect their reputations.

Image Source: Flickr user fdecomite

Using UV-Vis Spectrophotometry to Detect Fake Olive Oil

In an attempt to rein in the sale of fake olive oil, regulatory bodies in a number of countries have revised their grading standards and some have instituted optional certification programs that “allow olive oil brands to voluntarily submit their oils for lab tests.” Such certifications can help brands stand out from the pack and establish themselves as legitimate players, protecting their reputations and potentially helping companies realize meaningful profit gains. In an increasingly complex global market with diminishing control over supply chains, however, olive oil brands may not even be aware of adulteration or counterfeiting in their own products. As such, the establishment of internal testing protocols is vital to identifying contaminated product.

UV-Vis spectrophotometry offers an accurate, rapid, and economically viable testing method to determine the purity of extra virgin olive oils. As explained in a study published in the *Palestine Technical University Research Journal*, “The analysis of olive oils at certain UV wavelengths can be used to assess the oxidation of the oils and can also indicate the presence of a refined olive oil in virgin olive oil not with other vegetable oils.”⁴ This is because absorbance values of refined oils, especially around the 270 nm mark, “are in fact significantly higher than those of virgin and extra virgin olive oils.” In the study, researchers spectrophotometrically identified maximum absorbance frequencies in the absorption bands between 200 and 400 nm. “A low absorption in this region is indicative of a high quality extra virgin olive oil, whereas adulterated/refined oils show a greater level of absorption in this region.” As a result, the research team was able to detect even small percentages of sunflower, corn, and soybean oil in olive oil.

Adopting UV-Vis technology part of quality control programs to detect fake olive oil could be an essential part of maintaining and expanding market share and protecting against backlash as public awareness of adulteration and counterfeiting grows.

HunterLab Innovation

HunterLab has been a pioneer in the field of spectrophotometry for over 60 years. Today we offer a comprehensive range of [portable, benchtop, and in-line instruments](#) ideally suited for the needs of the food industry. Our commitment to technological innovation and responsiveness to our customers means that our instruments are extraordinarily accurate, versatile, and user-friendly. [Contact us](#) for more information about our renowned spectrophotometers, customizable software packages, and superior customer service, and let us help you select the right instrument for your needs.

1. "Your Extra-Virgin Olive Oil Is Fake," <http://www.foodrenegade.com/your-extravirgin-olive-oil-fake/>
2. "Is Your Extra Virgin Olive Oil Really Extra Virgin?" October 3, 2011, <http://www.laboratoryequipment.com/article/2011/10/your-extra-virgin-olive-oil-really-extra-virgin>
3. "Extra Virginity: The Sublime and Scandalous World of Olive Oil by Tom Mueller: Review," January 13, 2012, <https://www.theguardian.com/books/2012/jan/13/extra-virginity-tom-mueller-review>
4. "Detection and Quantification of Adulteration in Olive Oil using a UV- Spectrophotometric Method," February 11, 2014, https://www.researchgate.net/publication/260449534_Detection_and_Quantification_of_Adulteration_in_Olive_Oil_using_a_UV-_Spectrophotometric_Method